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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,481	06/22/2001	Harri Posti	930.332USW1	7569

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EXAMINER	
PHU, PHUONG M	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/887,481	POSTI, HARRI	
	Examiner	Art Unit	
	Phuong Phu	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-38 and 40-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-27,29-38 and 40-49* is/are rejected.

7)☒ Claim(s) *28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on 8/30/04.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 23-27, 29-38 and 40-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Helms (2001/0014592), in view of Carney et al (5,937,011), prior art of record.

As per claims 23 and 44-49, see figure 4 and page 2, section [0028] to page 3, section [0035], Helms discloses a method and associated system comprising:

combiner step/means (DUC, SUM) for combining a plurality of different carrier-related signals (in1,...,inn) to provide a composite digital signal (in_{pr});

D/A converting step/means (DAC) for converting said composite digital signal into a composite analog signal;

amplifier step/means (UM, PA) for receiving and amplifying said composite analog signal;

predistortion step/means (PDD) for predistorting said plurality of different carrier-related signals wherein the predistortion performed by step/means (PDD) is performed prior to the amplifier step/means, and dependent on the difference between each of said different carrier-related signals (in1,..., in2) and the output (outm) of said amplifier step/means (see [0030],[0033]).

Further regarding to claims 46 and 49, Helms further discloses an A/D converter step/means (DM, ADC) for converting the output of the amplifier step/means into a composite digital signal comprising a plurality of digital signals outputted from means (ADC); and a chanelizing step/means (DDC) for converting said composite digital signal into a plurality of different digital signals (see figure 4).

Helms does not disclose input step/means for receiving a plurality of different digital signals and modulating step/means for modulating said different digital signals at respective carrier frequencies. He neither discloses that predistortion step/means (PDD) is performed after a modulation.

However, he discloses that said plurality of different carrier-related signals (in1,...,inn) are formed by being located to respective carrier frequencies 1-n over a bandwidth (B) (see section [0028] and figure 2), but he does not disclose how said plurality of different carrier-related signals are formed in detail. On the other hand, Carney et al teaches that n different carrier-related signals allocated on respective carrier frequencies over a bandwidth are formed by modulating a plurality of n received data digital signals (I21-1,..., I21-n) by using a plurality of modulating step/means (120-1, 120-n) to allocate said n received data digital signals on respective carrier frequencies equal spaced apart over a frequency bandwidth (see col. 3, lines 26-33 and lines 38-43). Therefore, for an application of implementation for obtaining said plurality of different carrier-related signals, as required in Helms, it would have been obvious for one skilled in the art, when building Helms invention, to form said plurality of different carrier-related signals (in1,...,inn) by using a plurality of modulating step/means, as taught by Carney et al, to allocate n received different digital signals on respective carrier frequencies equal spaced

apart over the required frequency bandwidth (B) by modulating the different digital signals with respective carrier frequencies in order to form or to obtain a plurality of different carrier modulated signals, being now as said required different carrier-related signals (in1,...,inn). As a result, the implementation of Helms in view of Carney et al, discloses modulating step/means for modulating different digital signals with respective carrier frequencies to form said different carrier-related signals (in1,...,inn), as a plurality of different carrier modulated signals, and said predistortion step/means (PDD) being performed after the modulation of said plurality of modulating step/means wherein an input means is inherently included for receiving said different digital signals.

As per claim 24, in Helms in view of Carney et al, said modulating step/means inherently separately receives each of said different digital signals in order to perform a modulation with each of them with a corresponding carrier in order to provide separate carrier modulated signals (in1,..., in n) at the input of means (PDD) (see Helms, figure 4).

As per claim 25, Helms discloses a combiner means (DUC, SUM) to provide a composite digital signal (see figure 4).

As per claim 26, Helms discloses said distortion step/means, using means (PD1,..., PDn), predistorts individually said each of said plurality of different carrier modulated signals (see figure 4).

As per claim 27, Helms discloses said distortion step/means predistorts said plurality of different carrier modulated signals before being combined in said combiner step/means (see figure 4).

As per claim 29, Helms discloses a feedback path (DDC, ADC, DM) (see figure 4).

As per claims 30 and 33, Helms discloses that the distortion step/means compares the output from the amplifier step/means for the feedback path with the signals received by the input receiving and modulating step/means and provides predistortion values applied to a subsequent signal received by the input receiving and modulating step/means (see figure 4 and page 2, section [0029] to page 3, section [0033]).

As per claim 31, Helms discloses means (AK, DM, ADC) for separating the output of the amplifier step/means into a signal comprising a plurality of different digital signals (outm1,...,outmn) (see figure 4).

As per claim 32, Helms discloses that said predistortion step/means compares each of said separated signals with the corresponding signal received from said input receiving and modulating step/means to determine predistortion values to be altered (see figure 4 and page 2, section [0029] to page 3, section [0033]).

As per claim 34, Helms discloses that said predistortion step/means provides a plurality of predistortion values stored in means (LUT), each provided for the respective carrier frequency (see figure 4).

As per claim 35, Helms discloses that each of said predistortion values corresponding to a respective carrier frequency takes into account characteristics of other carrier frequencies (see page 1, section [0009]).

As per claim 36, Helms discloses that said characteristics comprise frequency and distortion (see page 1, section [0009]).

As per claim 37, Helms discloses that the amplifier step/means comprises an amplifier (PA).

As per claim 38, Helms discloses that said predistortion step/means compensates for the nonlinearity of amplitude of the amplifier (see page 1, section [0009]).

As per claims 40 and 41, Helms discloses an A/D converter step/means (ADC) as claimed (see figure 4).

As per claims 42 and 43, Helms discloses a station comprising the method and associated system (see pages 2, section [0024]).

Response to Arguments

4. Applicant's arguments filed on 8/30/04 have been fully considered but they are not, in part, persuasive.

-The rejections, under 35 U.S.C. 112, second paragraph, to claims 23-38, 40-43 and 46-49 have been withdrawn since the claims were amended to overcome the rejection.

-The rejections to claims 23-25, 28-31, 33, 37, 38, 40, 42-45, 47 and 48, as being anticipated by Carney et al (5,937,011), have been withdrawn since the claims were amended to overcome the rejection.

-The applicant's argument with respect to the rejections to claims 23-27, 29-38 and 40-49, as being anticipated by Helm in view of Carney et al, is not persuasive. The applicant mainly argues that it would not have been obvious to one skilled in the art to modulate the carrier signals (in1,...,inn), in Helm, prior to being input into the predistortion unit (PDD) by a modulating means, as taught by Carney et al.

The examiner thinks that the applicant misunderstood the reasons why the implementation of a modulating means, as taught by Carney et al, into Helm invention would have been obvious for one skilled in the art, as set forth in this Office Action and the previous

Office Action. In the implementation of Helm in view of Carney et al, the modulating means, means, as taught by Carney et al, **does not modulate the carrier signals (in1,...,inn)**, as being misunderstood by the applicant; in stead, the modulating means modulates a plurality of different digital signals with respective carrier frequencies equal spaced apart over a frequency bandwidth, as taught by Carney et al, **in order to form or to obtain the carrier signals (in1,...,inn)**, as required in Helm. For further clarifying the reason for the rejection, it is now explained as follows:

As being explained in the above rejection, under 35 U.S.C 103, Helms does not disclose input step/means for receiving a plurality of different digital signals and modulating step/means for modulating said different digital signals at respective carrier frequencies. He neither discloses that predistortion step/means (PDD) is performed after a modulation. However, he discloses that said plurality of different carrier-related signals (in1,...,inn) are formed by being located to respective carrier frequencies 1-n over a bandwidth (B) (see section [0028] and figure 2), but he does not disclose how said plurality of different carrier-related signals are formed in detail. On the other hand, Carney et al teaches that n different carrier-related signals allocated on respective carrier frequencies over a bandwidth are formed by modulating a plurality of n received data digital signals (I21-1,..., I21-n) by using a plurality of modulating step/means (120-1, 120-n) to allocate said n received data digital signals on respective carrier frequencies equal spaced apart over a frequency bandwidth (see col. 3, lines 26-33 and lines 38-43). Therefore, **for an application of implementation for obtaining said plurality of different carrier-related signals, as required in Helms**, it would have been obvious for one skilled in the art, when building Helms invention, to form said plurality of

different carrier-related signals (in1,...,inn) by using a plurality of modulating step/means, as taught by Carney et al, to allocate n received different digital signals on respective carrier frequencies equal spaced apart over the required frequency bandwidth (B) by modulating the different digital signals with respective carrier frequencies **in order to form or to obtain a plurality of different carrier modulated signals, being now as said required different carrier-related signals (in1,...,inn)**. As a result, the implementation of Helms in view of Carney et al, discloses modulating step/means for modulating different digital signals with respective carrier frequencies to form said different carrier-related signals (in1,...,inn), as a plurality of different carrier modulated signals, and said predistortion step/means (PDD) being performed after the modulation of said plurality of modulating step/means wherein an input means is inherently included for receiving said different digital signals.

Based on the above rationale, it is believed that the limitations of claims are still met by Helm in view of Carney et al, and therefore, the rejections are still maintained.

Allowable Subject Matter

5. Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (6:30-2:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phuong Phu
Primary Examiner
Art Unit 2631

Phuong Phu

PHUONG PHU
PRIMARY EXAMINER

Phuong Phu
12/10/04